

REMARKS/ARGUMENTS

This amendment is further in response to the Office Action dated November 20, 2006. Reconsideration of the application is respectfully requested.

Claims 1, 3-6, 8-13, 15, 17, 18, 20-25 and 27-32 are in the case.

Claim Rejections 35 U.S.C. Section 103

In the Office Action dated November 20, 2006, the Examiner rejected claims 1-5, 7, 15 and 17-21 as being obvious in view of the combined teachings of Freeman et al. (U.S. 6,519,539) and Werth et al. (U.S. 4,931,947). The Examiner also rejected claim 6 as being unpatentable over Freeman et al. in view of Werth et al. and further in view of Dunn et al. (U.S. 6,239,579). In addition, claims 8 and 9 were rejected as being unpatentable over Freeman et al. in view of Werth et al. and further in view of Stader et al. (U.S. 4,916,734). Further, claims 10-13 and 22-25 were also rejected as being unpatentable over Freeman et al. in view of Werth et al., Stader et al. and further in view of Bisher (U.S. 5,416,416).

The claims have been amended in response to these rejections. The rejections are respectfully traversed with respect to the claims as amended for the reasons given below.

Claim amendments

In response to the Office Action, the independent claims have been amended and new independent claim 27 has been added, together with new dependent claims 28 to 32.

Claim 1 has been amended by removing the limitations added by previous amendments, and by adding the limitations of former claims 2 and 7. Former claims 2 and 7 have been cancelled.

Similarly, independent method claim 17 has been amended by removing the limitations formerly added to this claim in earlier amendments, and by amending this claim to incorporate the limitations of former claim 19.

By these amendments, both claims 1 and 17 specify that the modulated current values are imposed across the plurality of cells of the electrochemical device in burst time periods, with time periods between the burst time periods of no superimposition of modulated current values.

In addition, new independent claim 27 has been added. Independent claim 27 has been generated by amending claim 1 as originally filed to incorporate the limitations of former claims 2 and 8 as originally filed.

Dependent claims 28-32, depending from claim 27, have also been added. These claims are based on claims 9-13 as originally filed.

Detailed Reply to Claim Rejections

Rejection of former claims 7 and 19

In paragraph 2 of the Office Action dated November 20, 2006, the Examiner takes the position that Freeman et al. discloses a modulator that is arranged to superimpose a modulated current values in burst time periods. The Examiner refers to lines 1-33 of column 6. The applicant has reviewed the teachings of Freeman et al., with particular attention to the portions identified by the Examiner as relevant. However, the applicant has been unsuccessful in finding where this feature is disclosed by Freeman et al.

Freeman et al. describe a self-contained portable apparatus 10 for impedance measurement of the fuel cell. This apparatus 10 comprises a load bank 100 that is controlled to test the operation of the fuel cell 90. During this testing, the test fuel cell

90 is not being used in any other load; the only load being met by the test fuel cell 90 is the load bank 100.

The present invention relates generally to a system and method for measuring internal resistance of an electrochemical device. More particularly, it relates to a system and method for measuring the internal resistance of individual fuel cells within a fuel cell stack, the fuel cell stack operating under dynamic flow conditions as well as under varying load conditions, which may involve stand-alone power generation in a real world application. By superimposing the modulated current through the plurality of fuel cells only during burst time periods, separated by rest time periods during which no modulated current is applied, the fuel cell stack is able to meet the demands of the real-world load without interference by imposition of the modulated current. This is advantageous in the real world applications contemplated by the present invention, and is neither suggested nor described by the cited art.

In view of the foregoing, and in view of the amendments to independent claims 1, and 17, it is respectfully submitted that these claims clear the art cited. If the Examiner elects to maintain this rejection, then clarification is requested. In particular, the Examiner is requested to identify the relevant portions of the references cited disclosing superimposing modulated current values across a plurality of cells in burst time periods, with time periods between the burst time periods of no superimposition of modulated current values.

Former claims 8-13

The Examiner rejected claims 8 and 9 as being unpatentable in view of the combined teachings of Freeman et al., Werth et al. and Stader et al. Specifically, the Examiner mentioned that neither Freeman et al. nor Werth et al. disclose a measuring device including a splitter for separating out at least DC components of the voltages across

the individual cells from the primary channels. However, the Examiner takes the position that Stader et al. disclose such a splitter.

Stader et al. disclose an apparatus for separating DC current and AC current components of a composite signal. As mentioned in column 1, lines 25-30, the Stader apparatus aims to address conditions of modern subscriber line circuits for connecting subscriber lines to digital time division multiplexing telephone system. There does not appear to be any mention in this patent of its applicability to measuring the internal resistance of fuel cells.

To establish obviousness, 1) the prior art references relied upon must teach all claimed limitations; and, 2) if multiple references are relied upon, there must exist some motivation or suggestion to combine the references. In the case of the rejection of former claim 8, it is unclear to the Applicant where the Examiner found the motivation to combine the teachings of Stader et al., Werth et al. and Freeman et al., especially given that Stader et al. does not appear to relate to the fuel cell arts at all. In the absence of such motivation, it is respectfully submitted that it is improper to combined the teachings of Stader et al. with those of the other references relied upon to reject former claim 8.

Based on the foregoing, it is respectfully submitted that new claim 27, which incorporates the limitations of former claims 2 and 8 into former claim 1, clears the art cited. If the Examiner elects to reject this claim based on this art, then the Examiner is respectfully requested to explain where he finds the motivation for combining the cited references.

In view of the foregoing, it is respectfully submitted that the claims of the present application are allowable over the cited references. Allowance of the application is respectfully requested. If there are any questions regarding this amendment, the Examiner is respectfully requested to contact Ian C. McMillan at the number indicated below.

Respectfully submitted,

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